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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:  
PATON

Serial No.: 09/680,286  
Filing Date: October 6, 2000  
Docket No.: ENP-101

Title: REMOTE MONITORING OF CRITICAL PARAMETERS OR CALIBRATION OF  
MANUFACTURING EQUIPMENT AND FACILITIES

TRANSMITTAL

Date Mailed: November 26th, 2002  
Examiner: NOLAND, Thomas P.  
Group Art Unit: 2856  
Commissioner of Patents and Trademarks  
Washington, D.C. 20231

TRANSMITTAL

Dear Sir:  
In response to the Notice of Non-Compliant Amendment (37 CFR 1.121), please find the following documents related to the above-entitled patent application:

- 1) A clean version of the replacement paragraph(s) "SUMMARY OF THE INVENTION" according to 37 CFR 1.121(b)(1)(ii).
- 2) Return Receipt Postcard.

Respectfully submitted,

Eric Paton

 11/25/02

Summary of Notice of Non-Compliant Amendment (37 CFR 1.121)

Examiner states:

"The amendment filed on 10/25/02 is considered non-compliant because it has failed to meet the requirements of 37 CFR 1.121, as amended on September 8, 2000..... In order for the amendment to be compliant, applicant must supply the following omissions or corrections in response to the notice."

Examiner also states:

Response to Notice of Non-Compliant Amendment (37 CFR 1.121)  
Amendment Filed: 10/25/02  
Response mailed: November 26th, 2002.  
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"THE FOLLOWING ITEMS ARE REQUIRED FOR COMPLIANCE WITH RULE 1.121 (APPLICANT NEED NOT RESUBMIT THE ENTIRE AMENDMENT). A clean version of the replacement paragraphs(s)/section(s) is required: See 37 CFR 1.121(b)(1)(ii)."

5 Examiner also states:

"AMENDMENT AFTER NON-FINAL ACTION: Since the above-mentioned reply appears to be bona fide, applicant is given a TIME PERIOD OF ONE MONTH or THIRTY DAYS from the mailing of this notice, whichever is longer, within which to supply the omission or correction noted above in order to avoid abandonment."

10 **Corrections to Amendment**

**SUMMARY OF THE INVENTION**

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The present invention is an apparatus for measuring critical parameters used in manufacturing of capital goods in microelectronic processing without evasive interruptions to manufacturing equipment. In preferred embodiments, the critical parameters are selected from the group consisting of temperature, liquid and gas flow rate, distance, particles, humidity, pressure, viscosity, radiation, velocity, density, acceleration, stress/strain, and pH. In preferred embodiments, the critical parameters are related to chemical/material analysis techniques selected from the group consisting of Energy Dispersive X-ray Spectroscopy (EDS), Cathodoluminescence (CL), X-ray Photoelectron Spectroscopy (XPS), Ultraviolet Photoelectron Spectroscopy (UVPS), Auger Electron Spectroscopy (AES), Reflection High Energy Electron Diffraction (REELS), X-ray Fluorescence (XRF), Photoluminescence (PL), Modulation Spectroscopy, Variable Angle Spectroscopic Ellipsometry (VASE), Fourier Transform Infrared Spectroscopy (FTIR), Raman Spectroscopy, Solid State Nuclear Magnetic Resonance (NMR), Rutherford Backscattering Spectroscopy (RBS), Elastic Recoil Spectroscopy (ERS), Ion Scattering Spectroscopy (ISS), Residual Gas Analyzer (RGA), Dynamic/Static Secondary Ion Mass Spectroscopy, Laser Ionization Mass Spectroscopy (LIMS), Sputtered Neutral Mass Spectroscopy (SNMS), Glow Discharge Mass

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1 Spectroscopy (GDMS), Inductively Coupled Plasma Mass Spectroscopy, Inductively Coupled Plasma  
Optical Emission Spectroscopy, Neutron Diffraction, Neutron Reflectivity, Neutron Activation Analysis  
(NAA), Nuclear Reaction Analysis (NRA) and combinations thereof. In a preferred embodiment, the  
apparatus comprises one or more sensors, the one or more sensors attached to surfaces on the capital goods  
5 for collecting data therefrom. The invention also comprises an electronic device for processing data  
collected from the one or more sensors, and an energy source for the electronic device, wherein said  
sensors and electronic device reside completely on the surface of the capital goods. In a preferred  
embodiment, the electronic device comprises one or more of the following: an analog to digital converter, a  
signal conditioning device and a data recording device. A preferred embodiment further comprises an  
10 external wireless receiving module wherein the collected data is transmitted digitally in real-time from the  
electronic device to the external wireless receiving module, and wherein the data can be further utilized as  
desired. In a preferred embodiment, the electronic device further comprises a solid state memory device  
wherein the collected data is stored locally on the solid state memory device such that the data can later be  
downloaded and utilized. Optionally, the solid state memory is selected from the group consisting of  
15 Electrically Erasable Read Only Memory (EEPROM), Ferroelectric Random Access Memory (FeRAM),  
Magnetic Bubble Memory, Flash, Dynamic Random Access Memory, Static Random Access Memory,  
First In / First Out (FIFO) and Giant MagnetoResistive Random Access Memory (GMRRAM). In a  
preferred embodiment, the energy source comprises a battery functional at elevated temperatures up to  
150C. Optionally, the battery is selected from the group consisting of lithium metal, lithium ion. and  
20 Nickel Metal Hydride (NiH) batteries. A preferred embodiment further comprises an insulation to isolate  
the material to protect the electronic device from hostile manufacturing or processing environments.  
Optionally, the isolation material is selected from the group consisting of material with low thermal  
conductivity, material with low emissivity, and material with low convectivity. Optionally, the isolation  
material is selected from the group consisting of silica aerogel, carbon aerogel, silica whiskers, vermiculite,  
25 stabilized zirconia, clay, and combinations thereof. Optionally, the isolation material is a material with a  
high resistance to chemical attack or a material with low permeability. In a preferred embodiment, the one

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or more sensors, electrical device and energy source operate in a vacuum. In a preferred embodiment, any one of the one or more sensors, electrical device and energy source are hermetically sealed, such that the apparatus is particularly adapted to operation in a vacuum environment. In a preferred embodiment, the one or more sensors, electrical device and energy source are radiation hard, for operation of the apparatus in environments containing radioactive substance. Optionally, the isolation material isolates the one or more sensors, electrical device, and energy source from environmental radiation during operation of the apparatus in an environment containing radioactive substance.

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Certificate of Mailing

10 I hereby certify that this paper and documents referred to as attached therein are being deposited with the United States Postal Service using First Class Mail service under 37 CFR 1.08 on the date indicated above and is addressed to "Commissioner of Patents and Trademarks, Washington, D.C 20231."

Signed: \_\_\_\_\_ Date Mailed: Nov, 26, 2002.